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| EXAMINER | |
| HASSANZADEH, PARVIZ | |
| ART UNIT | PAPER NUMBER |

1763

DATE MAILED: 06/19/2002

3

Please find below and/or attached an Office communication concerning this application or proceeding.

21-3

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|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/683,149 | SCHAEPKENS, MARC | |
| | Examiner | Art Unit | |
| | Parviz Hassanzadeh | 1763 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 32-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed..
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-44 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-31, drawn to an apparatus, classified in class 118, subclass 723E.
- II. Claims 32-44, drawn to a method, classified in class 427, subclass 580.

The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Group II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the method does not required each of the plasma sources including a cathode, an anode and an inlet for a non-reactive plasma source gas disposed in a plasma chamber, thus, the method can be practiced by another materially different apparatus.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Robert P. Santandrea on 6/10/02 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-31. Affirmation of this election must be made by applicant in replying to this

Office action. Claims 32-44 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

The disclosure is objected to because of the following informalities:

on page 7, line 6, it is suggested to insert “, now US Patent No. 6,397,776” after “Yang et al.”

on page 7, line 7, it is suggested to delete “09/” and substitute therefor “09/683,148” .

Appropriate correction is required.

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the

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treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-14, 18-20, 22 and 25-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Hwang (US Patent No. 6,383,953 B2).

Hwang teaches a plasma processing apparatus (Figs. 4, 5) comprising:

a plurality of plasma torches 200, wherein as shown in Fig. 2, when a high DC voltage is applied to an inner electrode 210 and to an outer electrode 212, a high temperature plasma frame 218 is generated from a plasma gas introduced via an inlet tube 202 in each plasma torch 200 (column 5, lines 44-65) (at least one array of a plurality of plasma sources for generating a plurality of plasma, wherein each of the plurality of plasma sources includes a cathode, an anode, and an inlet for a non-reactive plasma source disposed in a plasma chamber);

a processing (deposition) chamber 302 in which a substrate 306 is mounted including (column 5, lines 33-42) (a deposition chamber for containing a substrate ...); and

a disk type supply plate 312 having a plurality of nozzles 314 is installed in the chamber 302 for supplying a reactive gas, wherein the plurality of the plasma torches penetrating through the plate 312 (column 6, lines 28-34 and column 7, lines 6-10) (at least one common reactant gas injector ...).

Regarding claims 2-4, 25, 26: as shown in Figs. 4 and 5, the expanding thermal plasma sources are arranged in at least two dimensional array pattern.

Regarding claims 5-8, 27-30: the pressure of the gas in the plasma source and the deposition chamber are considered process limitations and the apparatus of Knowles et al in view of Matsuda et al is capable of being operated under the conditions citedⁱⁿ the claims. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed dos not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114.

Regarding claims 9, 31: the plasma gas is an inert gas such as Ar (column 1, lines 47-54).

Regarding claims 10, 18: as shown in Fig. 5, the plate 312 having a first plurality of orifices 314 located at the central portion of the plate having a first flow rate, and having a second plurality of orifices 314 located at the peripheral portion of the plate having a second flow rate, wherein the first flow rate is substantially equal to the second flow rate.

Regarding claims 11-13, 19, 20: as shown in Fig. 5, the plate 312 having a first plurality of orifices 314 located at the central portion of the plate having a first predetermined number of orifices having a first linear density, and having a second

plurality of orifices 314 located at the peripheral portion of the plate having a second predetermined number of orifices having a second linear density, wherein the first predetermined number is equal to the second predetermined number; and the first linear density is equal to the second linear density.

Regarding claims 14, 22: as shown in Fig. 5, the plate 312 having a first plurality of orifices 314 located at the central portion of the plate each having a first conductance, and having a second plurality of orifices 314 located at the peripheral portion of the plate each having a second conductance, wherein the first conductance is equal to the second conductance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knowles et al (US Patent No. 5,560,779) in view of Matsuda et al (US Patent No. 6,189,485 B1).

Knowles et al teach an apparatus (Figs. 6-8) for depositing a uniform film coating on a planar surface of a substrate, the apparatus comprising:

a plasma generator 80 having an anode 82 with a plurality of first apertures 84 and second apertures 86, and cathode 88 disposed within the first apertures 84,

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wherein when a voltage is applied between the anode 82 and cathodes 88, an arc plasma is generated from a hydrogen source gas flowing through the first apertures 84 and wherein the second apertures 86 provides hydrocarbon feed gas; and

a deposition chamber 32 in which the plasma generator 80 and a substrate 36 are disposed as shown in Fig. 1 (column 5, lines 19-41).

In another embodiment shown in Fig. 8, an injector grid 100 having a plurality of spray bars 102 which are preferably parallel and equally spaced is used for injecting reactant gas into the plasma (column 5, lines 42-57).

Knowles et al fail to explicitly teach at least one common reactant gas injector disposed in the deposition chamber for providing a uniform flow rate of at least one reactant gas into each of the plurality of plasmas.

Matsuda et al teach a Plasma CVD apparatus wherein a material (reactant) gas is injected into a deposition chamber through a tubular body forming tubular electrodes 51a-51f having a plurality of gas openings 58, wherein a material ~~is~~ gas is entered through an entrance-side tubular electrode 51e, distributed into the tubular electrodes 51a - 51c (Figs. 7, 8) (column 9, lines 11-49).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the gas distribution ring as taught by Matsuda et al in the apparatus of Knowles et al in order to distribute a reactant gas uniformly over a substrate using a single reactant gas source.

Regarding claims 2-4, 25, 26: as shown in Figs. 6 and 7, the expanding thermal plasma sources are arranged in at least two dimensional array pattern.

Regarding claims 5-9, 27-31: the pressure of the gas in the plasma source and the deposition chamber as well as the type of the gas used are considered process limitations and the apparatus of Knowles et al in view of Matsuda et al is capable of being operated under the conditions cited the claims. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed dos not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114.

Regarding claims 10, 18: as shown in Fig. 8 of Matsuda et al, the tubular electrode 51a and 51d having a first plurality of orifices 58 having a first flow rate, and the tubular electrode 51b and 51c having a second plurality of orifices 58 having a second flow rate, wherein the first flow rate is substantially equal to the second flow rate.

Regarding claims 11-13, 19, 20: as shown in Fig. 8 of Matsuda et al, the tubular electrode 51a and 51d having a first plurality of orifices 58 having a first predetermined number of orifices having a first linear density, and the tubular electrode 51b and 51c having a second plurality of orifices 58 having a second predetermined number of orifices having a second linear density, wherein the first predetermined number is equal

to the second predetermined number; and the first linear density is equal to the second linear density.

Regarding claims 14, 22: as shown in Fig. 8 of Matsuda et al, the tubular electrode 51a and 51d having a first plurality of orifices 58 each having a first conductance, and the tubular electrode 51b and 51c having a second plurality of orifices 58 each having a second conductance, wherein the first conductance is equal to the second conductance.

Regarding claims 15-17, 21, 23, 24: the distribution of the openings or orifices as well as the shape of the gas injector are considered obvious modification for distributing the gas preferentially over a section of the array of plasma in order to inject the reactant gas uniformly over the plasma gas. It was held in *re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. (Also see MPEP 2144.04(d)).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Maeda et al (US Patent No. 5,620,523) teach a plasma reactor including a ring-shaped gas distributor (Figs. 8A, 8B, 9A, 9B);

Paquet (US Patent No. 5,985,378) teach a plasma reactor including a plurality of plasma sources arranged in a two dimensional array (Fig. 4).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (703)308-2050. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on (703)308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

P. Hassanzadeh
Parviz Hassanzadeh
Examiner
Art Unit 1763

June 12, 2002